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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,865	07/15/2003	Daisuke Hanaoka	245402006600	9131

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MORRISON & FOERSTER LLP  
755 PAGE MILL RD  
PALO ALTO, CA 94304-1018

EXAMINER
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VAN ROY, TOD THOMAS

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.F.

<b>Office Action Summary</b>	<b>Application No.</b> 10/620,865	<b>Applicant(s)</b> HANAOKA, DAISUKE	
	<b>Examiner</b> Tod T. Van Roy <i>pm</i>	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 11-14, 16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-14, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

The applicant's argument that the previously stated reference, Onomura, did not teach the metal film order to be formed on the laser chip, but on the support member, is thought to be correct, and the finality of the application is hereby withdrawn.

A new non-final rejection, based on newly found prior art, has been applied.

### ***Response to Arguments***

Applicant's arguments see Remarks, filed 12/21/2005, with respect to claim 11 have been fully considered and are persuasive. The final rejection of claims 11-14, and 16-17 has been withdrawn.

The applicant has further discussed the differences in the crystallographic structure of Reid versus the present invention, however, these deficiencies are made up for by Onomura and are addressed in the rejection to claim 11.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11-14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid (US 2003/0210720) in view of Onomura et al. (US 2002/0039374) and further in view of Gen-ei et al. (US 2002/0105981).

With respect to claims 11 and 16, Reid teaches a semiconductor laser device chip (fig.1) having a semiconductor stacked-layered structure including an n-type layer (fig.1 #9), an active layer (fig.1 #12) and a p-type layer (fig.1 #8') successively stacked on a main surface of a semiconductor substrate (fig.1 #11) and having a ridge stripe structure formed in a portion of said p-type layer (fig.1 #15) wherein said chip has a length L1 of more than 500um in a longitudinal direction of said strip structure ([0048] lines 9-10) and a length L2 of more than 200um in a width direction of said stripe structure ([0048] lines 7-8), and L1/L2 is more than 2.5 (4mm/.5mm=8), and the total thickness of the semiconductor substrate and semiconductor stacked-layered structure to be more than 50um and less than 200um (Reid, [0046-0047] total thickness approx. 150um). Reid does not teach the semiconductor laser device chip to be a nitride semiconductor laser device with a nitride substrate, or to use a support member bonded

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to the substrate via a Ti/Pt/Au contact and solder. Onomura teaches a nitride semiconductor laser device chip (wherein the layers being provide are based in the GaN material system and constitute a hexagonal crystal structure) with an n-type layer (fig.4 #15) an active layer (fig.4 #16) and a p-type layer (fig.4 #19) successively stacked on a main surface of a nitride semiconductor substrate (fig.4 #30) having a ridge stripe structure formed in a portion of said p-type layer (fig.4 #19), and further teaches the nitride semiconductor laser apparatus to include a support member for placing the nitride semiconductor laser device chip thereon (Onomura, [0074] lines 1-4, 2<sup>nd</sup> embodiment taught to be the same structure as the 1<sup>st</sup>, ([0068]) which would include the bonding of the chip to the mount via AuSn solder, and the new metal layer #22 on the opposite side of the substrate would contact the mount) being attached via solder ([0051]). Gen-ei teaches a laser device which uses a metal film ordering (Ti/Pt/Au) to facilitate contact between AuSn solder and a mount ([0037]). It would have been obvious to one of ordinary skill at the time the invention was made to combine the semiconductor laser device chip of Reid with the nitride material of Onomura to adjust the wavelength to an appropriate length (active region), and further, to include a support device to sink heat away from the device and improve the performance and reliability, as well as to use the metal ordering of Gen-ei, as this ordering is well known to be used in electrical contacts, to facilitate the easy soldering of the device to the mounting surface.

With respect to claim 12, the nitride semiconductor laser device as taught by Reid, Onomura, and Gen-ei, and further discloses said stripe structure to be formed at a

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position more than 10um away in the width direction of said stripe structure from an edge of said chip (Reid, fig.1 #15, where #15 is clearly centered on the nitride structure and #15 being not more than 7um wide, [0048] lines 6-7).

With respect to claim 13, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 11 above to include said support member to have a larger thermal expansion coefficient as compared to said nitride semiconductor substrate (Onomura, [0074] lines 1-4, the Cu support member inherently has a larger thermal expansion coefficient as compared with the GaN substrate).

With respect to claim 14, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 11 above to include said support member to be one of Al, Ag, Cu, Fe, Al-SiC, CuW and BeO (Onomura, [0074] lines 1-4).

With respect to claim 17, Reid, Gen-ei and Onomura teach the nitride laser outlined in the rejection to claim 11, and the use of a top surface of the stack layer to be connected to the heat sink (Onomura, [0074]). Reid, Gen-ei and Onomura do not teach combining the multilayer film with the top surface heat sink bonding. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the top surface heat sink bonding with the multilayer film to facilitate the easy soldering of the device to the mounting surface (see claim 11), and sink heat quickly away from the active region and to facilitate a more efficient heat transfer from the device, to the heat conductive metal film, and then to the heat sink.


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

  
MIN SUN HARVEY  
PRIMARY EXAMINER